
*
* CAMBEX CORPORATION *
* EDX CARTRIDGE TAPE COPY PROGRAM V2M3 *
* USER'S GUIDE *
*

PRELIMINARY

CAMBEX CORPORATION
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PREFACE

The Cambex EDX TPCOPY23 Program V2M3 is an EDX V3, V4 and V5 multi-purpose interactive program that performs data backup (SAVE) and retrieval (RESTORE) functions on a Cambex 80810-10 or 80820-10 Streaming Tape Cartridge Drive attached to a Series/1 computer. The program also performs tape maintenance functions.

The Cambex EDX TPCOPY23 Program is provided on a single sided Cambex supplied diskette (part number 22250833 Revision F). Questions or comments concerning this program may be directed to:

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* This program is distributed on an "as is" basis, *
* without warranty either expressed or implied. *

This program is intended for use only as described in this document. Cambex cannot be responsible for the improper functioning of undescribed features or undefined parameters. Additionally, this program is intended only for use with IBM EDX V3, V4, or V5 as supplied by the IBM Program Information Department (PID). The results obtained in attempting to use non-standard IBM software cannot be guaranteed to be as desired.

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INTRODUCTION

The TPCOPY23 program is a utility that runs on IBM Event Driven Executive Version 3 or later operating systems for IBM Series/1 computers.

The program facilitates the saving of disk data on cartridge tape and also allows the restoring of data from the cartridge tape to disk. The program will facilitate the saving and restoring of data on all levels, i.e. device, volume and data set level. Also, the whole backup procedure can be executed automatically from a previously created data set containing all the commands. The full screen text editor is used to create this data set.

RESTRICTIONS

There are some restrictions that are imposed by the Cambex program.

1. The program will run only on the IBM EDX version 3 or later release.
2. The program only supports devices included in the EDX system generation.
3. While performing a SAVE or RESTORE function the system should not be executing any other tasks as the following problems can occur:

The time required to execute a SAVE/RESTORE task may be unnecessarily long if executed while other tasks are executing because the streaming of the tape could be interrupted.

The other tasks may be modifying the data to be SAVED/RESTORED by the SAVE/RESTORE task.

4. The EDX TPCOPY23 program product is not compatible with TPCOPY20 or earlier releases in that a SAVE performed by V2M0 or earlier cannot be RESTORED with V2M3. This is because the buffer size has been altered.
5. When performing a List (LI), Save All (SA) or Save Member (SM) operation the user must ensure there is enough space on the IPL volume to allocate one 120 record data set to be used for a work area.
6. When performing a Restore All (RA) or Restore Member (RM) operation the user must ensure there is enough space on the IPL volume to allocate two 120 record data sets to be used for work areas.
7. For EDX V5 users with 4956E processors, programs must be loaded in static partitions.
8. ALX data sets are not supported at this time.

MINIMUM HARDWARE/SOFTWARE REQUIREMENTS

The TPCOPY23 utility executes under the IBM Event Driven Executive for IBM Series/1 computers. The utility requires the following minimum hardware configuration.

- Processor - An IBM Series/1 processor with at least 256KB of storage.
- Operator Station - Any operator station supported by the EDX system.
- Disk unit - An IBM 4962, 4963, 4967, 30D OR 60D disk or any of the Cambex disks.
- Diskette unit - Any IBM or Cambex diskette unit.
- Tape unit - A Cambex cartridge tape unit.

The TPCOPY23 utility requires 28KB of memory.

When performing a save option, TPCOPY23 will load another program named TPSAVE23, into the first available partition with enough memory. The TPSAVE23 program requires 36KB of memory.

When performing a restore option, TPCOPY23 will load another program named TPREST23, into the first available partition with enough memory. The TPREST23 program requires 36KB of memory.

If not enough memory is available to load TPSAVE23 or TPREST23 from the TPCOPY23 program see page 7-1 to see how to load TPSAVE23 and TPREST23 directly.

STREAMER TAPE OPERATIONAL RECOMMENDATIONS

SOFTWARE RECOMMENDATIONS

The Streamer Tape software has been enhanced to provide improved fault tolerance, additional hardware status, the number of retries for Save and Restore operations, and a -2 return code for operations with an excessive number of retries. From an operator perspective, the most useful aspect will be the number of retries for Save and Restore operations.

With the addition of reporting the number of retries for Save and Restore operations, the operator can monitor and maintain a system at its highest level of reliability. Paramount to reliable operation is the monitoring and maintenance of the cartridges. The most direct measure of the quality of the cartridges is a low number of retries or marginal blocks (the number of marginal blocks indicated in a Certify or Verify is derived directly from the number of retries).

The Certify command uses a worst case data pattern to test the cartridge for media flaws, ie, number of blocks rewritten to achieve a successful read after write. A new good quality cartridge will typically have less than 10 marginal blocks with 0 marginal blocks not being an uncommon occurrence. If the number of marginal blocks encountered during a Certify exceeds 1 marginal block per 2500 blocks read it is recommended that the cartridge be replaced. The Verify will normally have fewer marginal blocks than the Certify.

For save operations, the number of retries is an indication of the number of media flaws encountered which have resulted in records being rewritten (the unit does not break streaming but instead proceeds to rewrite the record farther down the tape up to 16 times in order to achieve a successful read after write). Corresponding to the Certify, the number of retries typically should be less than 10 with a new cartridge. Cartridges that have more than 1 retry per 2500 blocks read should be replaced. For Restore operations, the number of retries is an indication of the number of records which required rereading in order to recover them (the unit breaks streaming and reverses/re-reads up to 16 times in order to reread a record).

In conjunction with the number of retries being reported, a -2 return code has been added. The -2 return code means that the operation was successful but the number of retries was excessive (more than 1 marginal block per 2500 blocks read). The -1 return code means that the operation was successful and the number of retries was acceptable (less than 1 marginal block per 2500 blocks read).

The List Tape Header (LH) function should be run after all saves are done on a tape to provide an additional check on the overall operation of the tape.

Finally, for two special cases the search for blank tape operation is deleted because it is unnecessary. While in EX mode where an Initialize (I) or Clear (CL) operation has just taken place, the unit will not be requested to search for blank tape since the tape has just been erased and is properly positioned. The search for blank tape for all other instances remains as it was.

HARDWARE RECOMMENDATIONS

Hardware Environmental Conditions

Temperature/Humidity (Operating 5 to 45 C or 41 to 113 F)

As noted above, the normal office environment will provide excellent service life. However, high temperature and high humidity are particularly stressful to tape life. High temperature also reduces data margins for the media and may result in a higher number of retries.

Temperature/Humidity (Shipping -30 to +60 C or -22 to 140 F)

While a very wide temperature is permissible for shipping, sufficient time must be allowed for the cartridge to stabilize to room temperature prior to use (approximately 8 hours for extreme temperature situations). As well, the tape should be retensioned 3 or 4 times if subjected to extreme temperature or mechanical shock.

Environmental Particulates

While tape units are not susceptible to head crashes due to particles, their performance can be degraded by prolonged exposure to a dirty environment. In particular since cool air is drawn in from the front of the unit, smoking should be avoided while using the unit.

Maintenance

The only operator maintenance required is cleaning of the heads. Normally the primary source of head contamination is the accumulation of oxide from the tape. New tapes during the first few passes of operation tend to burnish the media resulting in some loose oxide which may cause some accumulation in the head gap. Note the units are by design mounted such that the oxide will fall down out of the cartridge minimizing the possibility of head contamination.

Under normal usage of half an hour a day, the heads should be cleaned every 100 hours or about six months. The introduction of 10 to 20 new cartridges a year should not require additional head cleaning if the routine maintenance is being performed. However, if the unit is indicating more retries than usual on a number of tapes, the heads should be cleaned to eliminate contamination as a potential cause.

NOTE: At present the only recommended operator cleaning of heads should be with a Perfect Data cleaning cartridge using a fluid approved for use on magnetic tape. Alcohol or other unapproved fluids may result in damage to both the media and the plastic/rubber portions of the cartridge.

Service Life

Under ideal use, the cartridge should provide satisfactory performance for 5000 passes (pass = an operation which moves the tape the length of one track). For a Save operation along with the attendant erase and rewind operations, a total of approximately 12 passes would be required. Thus a cartridge potentially could be used for approximately 500 Saves. In practice, the service life may be reduced to 100 Saves due to environmental or handling stresses.

To determine the serviceability of the cartridges, the number of retries or marginal blocks should be monitored. If the number of retries during a Save or marginal blocks during a Certify exceed 50 per cartridge, the cartridge should be removed from service. The cartridge may successfully operate above this level, but its reliability has been significantly reduced.

Note also that it is normal for the number of retries for a given cartridge to vary somewhat for consecutive Saves on the same unit. As well, there will be a variation in the number of retries when used on different units.

Tape verify should be run periodically on a saved tape to provide an additional check on the overall operation.

INSTALLATION AND LOAD PROCEDURE

In order to generate an IBM EDX system to support the Cambex EDX TPCOPY23 Program, the user must change \$EDXDEFS and LINKCNTL in volume EDX002 to support the cartridge tape as an OEM (EXIO) device.

\$EDXDEFS must include the EXIODEV statement.

The following is an example of \$EDXDEFS on volume EDX002 for V4.0.

```
$EDXDEF CSECT
      $ID
*
*           XPS
*       EVENT DRIVEN EXECUTIVE
*   VERSION 4, MODIFICATION LEVEL 0
*
*
*   SYSTEM MAXPROG=(5,5,5,5),PARTS=(32,32,32,32)
*
*
*   DISK   DEVICE=4964,ADDRESS=02,END=YES
*   EXIODEV ADDRESS=4C,RSB=12,MAXDCB=2,END=YES  **CARTRIDGE TAPE**
*
*
*
```

LINKCNTL must include support for the EXIO device.

```
*
*
* -----
*   EXIO SUPPORT          - MUST BE IN PARTITION 1
* -----
*   INCLUDE IOSEXIO      *3*   EXIO DEVICE CONTROL SUPPORT
```

For EDX V3 and V5, changes to \$EDXDEFS are the same as for V4.0. LINKCNTL for EDX V3 must also include the module shown below. This module is automatically included by V4.0 and V5.0 LINKCNTL.

```
INCLUDE EXIOINIT,XS3002      *M*   EXIO INITIALIZATION
```

To install and load the programs from disk, the user must copy the Cambex TPCOPY23 programs, using the IBM program \$COPYUT1, to the EDX system and then load the program.

The TPSAVE23 and TPREST23 programs must reside on the IPL volume to run save and restore from TPCOPY23.

Copy the program from diskette to the IPL volume as follows:

```
> $L $COPYUT1
```

```
THE DEFINED SOURCE IS EDX002 OK (Y/N)? N  
ENTER NEW SOURCE VOLUME:  CAMBEX
```

```
THE DEFINED TARGET VOLUME IS EDX002 OK (Y/N)? Y  
MEMBER WILL BE COPIED FROM CAMBEX TO EDX002 OK (Y/N)? Y
```

```
COMMAND (?): CALL
```

```
TPCOPY23      143 RECORDS COPIED  
TPSAVE23      171 RECORDS COPIED  
TPREST23      172 RECORDS COPIED
```

```
COMMAND (?): EN
```

```
$COPYUT1 ENDED
```

Load the Cambex TPCOPY23 program from the IPL volume as follows:

```
> $L TPCOPY23
```

The system responds with the following prompt:

```
CAMBEX CARTRIDGE TAPE UTILITY PROGRAM V2M3  
COPYRIGHT, CAMBEX CORPORATION, 1987
```

```
COMMAND (?):
```

If a program check occurs when loading TPCOPY23 and R1 has a value of 110, then the error is with an EXOPEN instruction. The most likely cause is that the module IOSEXIO has not been included in the system.

For new installations follow the procedures on the flowchart NEW SYSTEM SETUP on page 8-1.

TPCOPY23 COMMANDS

COMMAND PARAMETER DEFINITIONS

SAVENAME

Savename denotes the name you give to saved data on a tape. A savename can refer to a single file, a group of files, or an entire disk image. Savenames are 1 to 8 characters in length and can consist of the following characters: A-Z 0-9 \$ & # @ ! % ' () - _

TAPE-ID

Tape-id is the label you assign the tape during initialization. Tape-ids are 1 to 8 characters in length and can consist of the following characters: A-Z 0-9 \$ & # @ ! % ' () - _

TAPE DESCRIPTION

Tape description is a line of up to 80 characters describing the tape, entered by the user during initialization.

DEVICE ADDRESS

Device address is an one or two digit hex number entered for the disk address during a save device (SD) or a restore device (RD) operation.

TAPE ADDRESS

Tape address is a two digit hex number of the streaming tape unit. The tape address must be entered with the DA command.

DISK-VOLUME

The name of any EDX initialized disk volume.

TAPE-VOLUME

The name of the volume on tape to be used to restore members to disk using the RM or RA options.

TERMINAL

The name of any terminal or printer included during the system generation.

TAPE HEADER

The tape header consists of a tape-id and tape description that is written on the first block of the tape during the Initialization (I) or Clear (CL) operations.

To display the TPCOPY23 commands at your terminal, enter a question mark in reply to the prompting message COMMAND(?):

COMMAND (?): ?

SAVE FUNCTIONS:

SD -- SAVE A DISK DEVICE ON TAPE
SV -- SAVE A DISK VOLUME ON TAPE
SM -- SAVE A DISK MEMBER(S) ON TAPE
SA -- SAVE ALL DATA SETS ON A VOLUME TO TAPE

RESTORE FUNCTIONS:

RD -- RESTORE A DISK DEVICE FROM TAPE
RV -- RESTORE A DISK VOLUME FROM TAPE
RM -- RESTORE A DISK MEMBER(S) FROM TAPE
RA -- RESTORE ALL DATA SETS ON A VOLUME FROM TAPE

CONTROL FUNCTIONS:

LI -- LIST TAPE FILES
LH -- LIST TAPE HEADER
I -- INITIALIZE THE TAPE
CL -- CLEAR THE TAPE
ER -- ERASE THE TAPE
TN -- RETENSION THE TAPE
VF -- VERIFY THE TAPE (READ TEST)
CF -- CERTIFY THE TAPE (WRITE / READ TEST)
EX -- EXECUTES COMMANDS FROM A DATA SET
DA -- CHANGE TAPE DEVICE ADDRESS
DO -- CHANGE PRINTER OPTION
DD -- SELECT DUAL DRIVE 80820-10 drive only
D1 -- SELECT DRIVE 1 ONLY 80820-10 drive only
D2 -- SELECT DRIVE 2 ONLY 80820-10 drive only
EN -- EXIT THE TAPE UTILITY

USE ("ATTN" CA) TO CANCEL CONTROL FUNCTIONS

USE ("ATTN" ABORT) TO CANCEL SAVE/RESTORE FUNCTIONS

COMMAND (?): EN

SAVE COMMANDS

The SAVE commands allow the saving of data at the device level, the volume level, or the data set level. The utility saves data from the source disk to the target tape.

The SAVE commands require the tape(s) to have been initialized using the Initialize (I) command.

A new feature has been added for the 80820-10 model tape streamers which allows the operator to choose to use a fast search method to position the tape at the end of recorded data. Note: if this method is used it is up to the operator to ensure the Savename being used for the current save does not already exist on the tape.

If the 80820-10 model tape streamers are being used as a dual drive, the save will automatically be continued on the cartridge in drive 2 when the end of the tape in the cartridge in drive 1 is encountered.

The SAVE command requires date and time information before executing any SAVE command option. The SAVE utility determines whether a timer is present on the system and whether the date and time have been set. If the system cannot provide the date and time, the utility prompts the user for the information.

SD - SAVE A DEVICE

The SD option saves the entire contents of a disk device to the cartridge tape.

EXAMPLE: Save a disk device at address 3 on tape.

```
COMMAND (?): SD
APPEND TO TAPE (Y/N) Y
*** WARNING ***
NO OTHER PROGRAMS SHOULD BE RUNNING TO ENSURE A VALID SAVE
*** WAIT ... REWINDING TAPE ***
TAPE-ID: TAPE01
TAPE DESCRIPTION:
This tape contains ...
ENTER SAVENAME: SAVE003
ENTER DEVICE ADDRESS IN HEX: 03
ENTER DATE MM DD YY: 11 12 84
ENTER TIME HH MM: 4 00
*** WAIT ... SEARCHING FOR BLANK TAPE ***
SAVE DEVICE ADDRESS 0003 USING SAVENAME SAVE003 OK? (Y/N): Y
DEVICE SAVE STARTED
DEVICE SAVE COMPLETED 246000 RECORDS SAVED
SAVE COMMAND (?): EN
```

Press PF1 key to check the progress of the command during the SD command execution. Note that checking the progress of command execution interrupts streaming so that the copy will be interrupted for about two seconds each time PF1 is pressed.

NOTE: Enter a N or NO to the 'APPEND TO TAPE (Y/N)' prompt if you wish to copy to the beginning of the tape. This will cause the tape to be re-initialized.

SAVE PROCESS USING MULTIPLE TAPE CARTRIDGES

The SAVED data may require more than one tape cartridge. It is recommended having extra initialized tape cartridge(s) in case the SAVE spans multiple cartridges. If the amount of data does require more than one tape cartridge, the utility assigns a segment number (enclosed in parenthesis) to the savename. Use the LI command to display the segment number.

When the utility detects the end of a tape during execution of the SAVE command option, the utility issues the following prompt.

END OF TAPE ENCOUNTERED. ANOTHER TAPE IS REQUIRED TO COMPLETE THE SAVE.
ANY EXISTING DATA ON THE NEXT TAPE WILL BE LOST.

*** WAIT *** REWINDING TAPE ***

DO YOU WISH TO CONTINUE? (Y/N): Y

If the response is Y or YES the utility issues the following prompt:
INSERT ANOTHER TAPE CARTRIDGE AND HIT ENTER

If the user enters N or NO in response to the prompt to continue on another tape, the utility issues the following message:
SAVE ABORTED BY OPERATOR. SAVE DATA INCOMPLETE.

If the data does require additional cartridges, the user responds as follows:

- Waits for the current tape to rewind.
- Removes the current tape cartridge from the drive.
- Inserts a new tape cartridge into the drive.
- Enters Y or YES in response to the prompt.

After the user inserts the continuation tape and hits the enter key the utility issues the following information messages:

*** WAIT ... REWINDING TAPE ***

TAPE-ID: TAPE02

TAPE DESCRIPTION

This tape contains ...

If the tape is not blank the following message will be displayed:

*** WARNING ***

THIS TAPE IS NOT BLANK. ALL EXISTING DATA WILL BE LOST.

DO YOU WISH TO CONTINUE THE SAVE ON THIS TAPE ? (Y/N)

If the response is Y or YES the utility will re-initialize the tape and continue the save.

If the response is N or NO the utility will prompt for a different tape to be inserted.

SAVE PROCEEDING

SV - SAVE A VOLUME

Use the SV command to save a disk volume on tape.

EXAMPLE : Save volume EDX003 on tape

```
COMMAND (?): SV
APPEND TO TAPE (Y/N) Y

*** WARNING ***
NO OTHER PROGRAMS SHOULD BE RUNNING TO ENSURE A VALID SAVE
*** WAIT ... REWINDING TAPE ***

TAPE-ID: TAPE01
TAPE DESCRIPTION:
This tape contains ...

ENTER SAVENAME: VOL003
ENTER VOLUME: EDX003
ENTER DATE MM DD YY: 10 12 84
ENTER TIME HH MM: 4 22

*** WAIT ... SEARCHING FOR BLANK TAPE ***

VOLUME SIZE: 20000 DISK RECORDS
SAVE VOLUME EDX003 USING SAVENAME VOL003 OK? (Y/N): Y

VOLUME SAVE STARTED
VOLUME SAVE COMPLETED 20000 RECORDS SAVED

SAVE COMMAND (?): EN
```

Press PF1 key to check the progress of the SAVE operation.
If the utility detects the end of tape during execution of the SV option, the utility issues the prompts as described in the earlier section, SAVE PROCESS USING MULTIPLE TAPE CARTRIDGES.

SM - SAVE SPECIFIC DATA SET(S)

Use the SM command to save specific data set(s) from a disk volume on tape. This option saves a single data set, multiple data sets or data sets with a specific prefix. To save all data sets with the prefix e.g. DES the user enters the prefix followed by enough question marks to create an eight character name. The question mark(?) is a place-holder as shown below by the three prefix examples.

EXAMPLE : Save data set(s) from volume EDX003 to tape.

```
COMMAND (?): SM
APPEND TO TAPE (Y/N) Y

*** WARNING ***
NO OTHER PROGRAMS SHOULD BE RUNNING TO ENSURE A VALID SAVE
*** WAIT ... REWINDING TAPE ***

TAPE-ID: TAPE01
TAPE DESCRIPTION:
This tape contains ...

ENTER SAVENAME: SAVEDS
ENTER VOLUME: EDX003
ENTER DATE MM DD YY: 10 12 84
ENTER TIME HH MM: 4 22

*** WAIT ... SEARCHING FOR BLANK TAPE ***

(Enter data set names in one or a combination of the formats
displayed below)

ENTER DATA SET(S) SEPARATED BY SPACES:
BKPTST OR
ENTER DATA SET(S) SEPARATED BY SPACES:
$DISKUT1 $COPY TEST TEST3 OR
ENTER DATA SET(S) SEPARATED BY SPACES:
DES????? OR
ENTER DATA SET(S) SEPARATED BY SPACES:
MY?SORTP OR
ENTER DATA SET(S) SEPARATED BY SPACES:
???SORTP
ENTER DATA SET(S) SEPARATED BY SPACES: (Hit ENTER to end input)
*** WAIT ... SEARCHING FOR BLANK TAPE ***
SAVE DATA SET(S) USING SAVENAME SAVEDS OK? (Y/N): Y
BKPTST $DISKUT1 $COPY TEST TEST3 DEST3 MY1SORTP
SAVE COMPLETED 7 DATA SET(S) SAVED
SAVE COMMAND (?): EN
```

If the utility detects the end of tape during execution of the SM option, the utility issues the prompt discussed in the earlier section, SAVE PROCESS USING MULTIPLE TAPE CARTRIDGES.

SA - SAVE ALL DATA SETS ON A VOLUME

Use the SA command to save all data sets on a disk volume to tape.

EXAMPLE : Save all data sets on volume ASMLIB to tape.

```
COMMAND (?): SA
APPEND TO TAPE (Y/N) Y

      *** WARNING ***
NO OTHER PROGRAMS SHOULD BE RUNNING TO ENSURE A VALID SAVE
*** WAIT ... REWINDING TAPE ***

TAPE-ID: TAPE01
TAPE DESCRIPTION:
This tape contains ...

ENTER SAVENAME: SAVEASM
ENTER VOLUME:   ASMLIB
ENTER DATE MM DD YY:  9 12 84
ENTER TIME HH MM:    1 22

*** WAIT ... SEARCHING FOR BLANK TAPE ***

SAVE DATA SET(S) USING SAVENAME SAVEASM  OK? (Y/N): Y
(A list of all the data sets saved is displayed on the terminal)
SAVE COMPLETED    50    DATA SET(S) SAVED

SAVE COMMAND (?): EN
```

If the utility detects the end of tape during execution of the SM option, the utility issues the prompt discussed in the earlier section, SAVE PROCESS USING MULTIPLE TAPE CARTRIDGES.

RESTORE COMMAND

The RESTORE command allows the restoration of data from a tape cartridge to a disk device. The restored data was previously saved on the tape cartridge. The data can be restored at the device, volume, or selected data set level.

Once the correct savename has been located on tape, the following information will be displayed about the file: savename, segment number, savetype, date, time, Volume name. The operator will then be asked if this is the correct file to be restored. If the operator responds "NO", the operator will be given the option to continue to search the tape for another file with the same savename.

When a 80820-10 model tape streamer is being used as a dual drive and the end-of-data is encountered on the cartridge in drive 1 the software will automatically switch to the cartridge in drive 2 to look for the continuation of the file currently being restored.

RD - RESTORE A DEVICE

The RD option restores the complete contents of a saved disk device to the disk. To restore information from tape, the tape must have been created previously using the save option (SD). Use the RD command to restore a disk device.

For fixed head devices the fixed head volume must have been allocated and initialized before restoring the device.

EXAMPLE: Restore a disk device at address 3.

```
COMMAND (?): RD
*** WARNING ***
NO OTHER PROGRAMS SHOULD BE RUNNING TO ENSURE A VALID RESTORE
*** WAIT ... REWINDING TAPE ***
TAPE-ID: TAPE01
TAPE DESCRIPTION:
This tape contains ...
ENTER SAVENAME: SAVE003
*** WAIT ... SEARCHING TAPE FOR SAVENAME SAVE003 ***
SAVENAME FOUND
SAVENAME: SAVE003 (1)
SAVE TYPE: SD
DATE: 11/12/84      TIME: 4:00
IS THIS THE CORRECT FILE TO BE RESTORED? (Y/N): Y
ENTER DEVICE ADDRESS IN HEX: 03
RESTORE TO DEVICE ADDRESS 0003 USING SAVENAME SAVE003 OK? (Y/N): Y
DEVICE RESTORE STARTED
DEVICE RESTORE COMPLETED. 246000 RECORDS RESTORED
RESTORE COMMAND (?): EN
```

Press PF1 key to check the progress of the command during the RD command execution.

RESTORE OF MULTIPLE CARTRIDGES

For multiple cartridge restore the program issues the prompts:

END OF TAPE ENCOUNTERED.

RESTORE NOT COMPLETE. DO YOU WISH TO CONTINUE? : Y

INSERT NEXT TAPE CARTRIDGE AND HIT ENTER

*** WAIT ... REWINDING TAPE ***

TAPE-ID: TAPE02

TAPE DESCRIPTION:

This tape contains ...

RESTORE PROCEEDING

If an N or NO is entered for the above prompt the program displays the following message and returns to the command prompt.

RESTORE ABORTED BY OPERATOR. RESTORE INCOMPLETE.

NOTE: If a 80820-10 model tape streamer is being used as a dual drive, the program will automatically switch to drive 2 to look for the continuation of file being restored. If the end-of-data is encountered on the cartridge in drive 2, the operator will be instructed what action must be taken to continue the restore.

RV - RESTORE A VOLUME

Use the RV command to restore a specific volume from tape cartridge to a disk device. To restore a volume from tape, the tape must have been created previously using the SV option.

EXAMPLE: Restore volume EDX003 on disk from tape.

```
COMMAND (?): RV
*** WARNING ***
NO OTHER PROGRAMS SHOULD BE RUNNING TO ENSURE A VALID RESTORE
*** WAIT ... REWINDING TAPE ***
TAPE-ID: TAPE01
TAPE DESCRIPTION:
This tape contains ...
ENTER SAVENAME: VOL003
*** WAIT ... SEARCHING TAPE FOR SAVENAME VOL003 ***
SAVENAME FOUND
SAVENAME: VOL003      (1)
SAVE TYPE: SV
DATE: 10/12/84      TIME: 4:22
VOLUME      SIZE
EDX003      20000
NUMBER OF DATA SETS SAVED FROM EDX003      5
IS THIS THE CORRECT FILE TO BE RESTORED? (Y/N): Y
RESTORE TO VOLUME EDX003 FROM SAVENAME VOL003 OK? (Y/N): Y
VOLUME RESTORE STARTED
VOLUME RESTORE COMPLETED. 20000 RECORDS RESTORED
RESTORE COMMAND (?): EN
```

Press PF1 key to check the progress of the command during the RV command execution.

If the utility detects end of tape during execution of the RV option, the utility issues the prompt for continuation discussed under the earlier section, RESTORE OF MULTIPLE CARTRIDGES.

RM - RESTORE SPECIFIC DATA SET(S)

Use the RM command to restore the specific data set(s) from cartridge tape to the disk device. This option restores a single data set, multiple data sets, or data sets with a specific prefix from tape, the tape may have been created previously using any of the save options. To restore all data sets whose names begin with the prefix e.g. DES, you enter the prefix followed by enough question marks to create an eight character name. The question mark(?) is a place-holder as shown below by the three prefix examples.

EXAMPLE : Restore data set(s) from tape to disk volume SMD003.
The tape data set(s) were saved using the SM option.

```
COMMAND (?): RM

      *** WARNING ***
NO OTHER PROGRAMS SHOULD BE RUNNING TO ENSURE A VALID RESTORE

*** WAIT ... REWINDING TAPE ***

TAPE-ID: TAPE01
TAPE DESCRIPTION:
This tape contains ...

ENTER SAVENAME: SAVEDS
*** WAIT ...SEARCHING TAPE FOR SAVENAME SAVEDS

SAVENAME FOUND

RESTORE TO VOLUME EDX003 OK (Y/N) N
ENTER DISK VOLUME: SMD003

RESTORE TO VOLUME SMD003 OK (Y/N) Y

(Enter the names of the data sets you want to restore)

ENTER DATA SET(S) SEPARATED BY SPACES:
BKPTST                                     OR

ENTER DATA SET(S) SEPARATED BY SPACES:
$DISKUT1 $COPY TEST TEST3                 OR

ENTER DATA SET(S) SEPARATED BY SPACES:
DES?????                                  OR

ENTER DATA SET(S) SEPARATED BY SPACES:
???SORTP                                  OR

ENTER DATA SET(S) SEPARATED BY SPACES:
M?1??????

ENTER DATA SET(S) SEPARATED BY SPACES: (Hit ENTER to end input)

(List of data sets restored displayed on terminal)
BKPTST $DISKUT1 $COPY TEST TEST3 DEST3 MY1SORTP

RESTORE COMPLETED 7 DATA SETS RESTORED

RESTORE COMMAND (?): EN
```


EXAMPLE : Restore data set(s) from tape volume EDX002 to disk volume SMD002. The data set(s) were saved using the SD option.

```
COMMAND (?): RM

      *** WARNING ***
NO OTHER PROGRAMS SHOULD BE RUNNING TO ENSURE A VALID RESTORE

*** WAIT ... REWINDING TAPE ***

TAPE-ID: TAPE01
TAPE DESCRIPTION:
This tape contains ...

ENTER SAVENAME: SAVE003
*** WAIT ...SEARCHING TAPE FOR SAVENAME SAVE003

SAVENAME FOUND

ENTER TAPE VOLUME NAME: EDX002
ENTER DISK VOLUME NAME: SMD002
RESTORE TO DISK VOLUME SMD002 USING TAPE VOLUME EDX002 OK? (Y/N): Y
(Enter the names of the data sets you want to restore)

ENTER DATA SET(S) SEPARATED BY SPACES:
BKPTEST                                     OR

ENTER DATA SET(S) SEPARATED BY SPACES:
$DISKUT1 $COPY TEST TEST2                 OR

ENTER DATA SET(S) SEPARATED BY SPACES:
DES?????                                  OR

ENTER DATA SET(S) SEPARATED BY SPACES:
???MTSOP                                   OR

ENTER DATA SET(S) SEPARATED BY SPACES:
MAT??RES

ENTER DATA SET(S) SEPARATED BY SPACES: (Hit ENTER to end input)

(List of data sets restored displayed on terminal)
BKPTEST $DISKUT1 $COPY TEST TEST2 DESCRIP1 PLIMTSOP
MAT12RES

RESTORE COMPLETED 8 DATA SETS RESTORED

RESTORE COMMAND (?): EN
```

If the utility detects the end of tape during execution of the RM option, the utility issues the prompt discussed in the earlier section, RESTORE OF MULTIPLE CARTRIDGES.

RA - RESTORE ALL DATA SETS TO A VOLUME

Use the RA command to restore all data sets from a tape volume to a specific volume on a disk device, the tape may have been previously created using any of the save options.

EXAMPLE : Restore all data sets to disk volume SMDLIB.
The tape volume was saved using the SA option.

```
COMMAND (?): RA
*** WARNING ***
NO OTHER PROGRAMS SHOULD BE RUNNING TO ENSURE A VALID RESTORE
*** WAIT ... REWINDING TAPE ***
TAPE-ID: TAPE01
TAPE DESCRIPTION:
This tape contains ...
ENTER SAVENAME: SAVEASM
*** WAIT ...SEARCHING TAPE FOR SAVENAME SAVEASM
SAVENAME FOUND
SAVENAME: SAVEASM (1)
SAVE TYPE: SA
DATE: 9/12/84      TIME: 1:22
VOLUME              SIZE
ASMLIB              20000
NUMBER OF DATA SETS SAVED ON ASMLIB  50
IS THIS THE CORRECT FILE TO BE RESTORED? (Y/N): Y
RESTORE TO VOLUME ASMLIB FROM SAVENAME SAVEASM OK? (Y/N): N
ENTER VOLUME: SMDLIB
RESTORE TO VOLUME SMDLIB FROM SAVENAME SAVEASM OK? (Y/N): Y
RESTORE STARTED
RESTORE COMPLETED  50  DATA SETS RESTORED
RESTORE COMMAND (?): EN
```

EXAMPLE : Restore all data sets to disk volume SMDLIB
from tape volume ASMLIB. The volume was saved
on tape using the SD option.

```
COMMAND (?): RA

      *** WARNING ***
NO OTHER PROGRAMS SHOULD BE RUNNING TO ENSURE A VALID RESTORE

*** WAIT ... REWINDING TAPE ***

TAPE-ID: TAPE01
TAPE DESCRIPTION:
This tape contains ...

ENTER SAVENAME: SAVE003
*** WAIT ...SEARCHING TAPE FOR SAVENAME SAVE003

SAVENAME FOUND
SAVENAME: SAVE003 (1)
SAVE TYPE: SD
DATE: 11/12/84      TIME: 4:00
IS THIS THE CORRECT FILE TO BE RESTORED? (Y/N): Y
ENTER TAPE VOLUME NAME: ASMLIB
ENTER DISK VOLUME NAME: SMDLIB
RESTORE TO DISK VOLUME SMDLIB USING TAPE VOLUME ASMLIB OK? (Y/N): Y
RESTORE STARTED

RESTORE COMPLETED   50  DATA SETS RESTORED

RESTORE COMMAND (?): EN
```

If the data sets restore spans multiple cartridges refer to the earlier section, RESTORE OF MULTIPLE CARTRIDGES.

LI - LIST CONTENTS OF TAPE

Use the LI command to display the contents of the cartridge tape(s) currently in the drive(s). The command displays the following information.

- Tape identification name and the tape description given during initialization.
- Tape savename, the name under which data was saved on the tape.
- Segment number, the sequence number of the tape. The segment number in parenthesis, identifies the sequence of the tape in a series of tapes containing a single file, volume, or device.
- Device address, the address of the device whose contents were saved on the tape.
- Volume name, the name of the volume whose contents were saved on tape.
- Data set name(s), the names of the data set(s) saved on tape.

EXAMPLE: List the contents of the savename SAVE003 for a device save.

```
COMMAND (?): LI
*** WAIT ... REWINDING TAPE ***
ENTER SAVE NAME (DEFAULT IS LIST ALL): SAVE003
TAPE-ID: TAPE01
TAPE DESCRIPTION:
This tape contains ...

*** WAIT ... LIST IN PROGRESS ***
SAVENAME: SAVE003 (1)
SAVE TYPE: SD
DATE: 11/12/84          TIME  4:00

VOLUME NAME  DEV  ADDRESS  FIRST RECORD  SIZE
EDX002       003      721      20000
EDX003       003     20721      20000
.            .
.            .
.            .

CONTENTS OF WHICH VOLUME: EDX002

(Enter the name of a volume to display the data set directory.
Hit enter to skip displaying the data set directory.)

NAME      TYPE      FIRST RECORD  SIZE  EOD/PGMSZ
$DASDI    PGM        721          52    52
WORK      DATA     1721         2000   NA
.          .
.          .
.          .

DO YOU WISH TO CONTINUE? (Y/N): N
LIST COMPLETE ***
*** WAIT ... REWINDING TAPE ***
COMMAND(?): EN
```

EXAMPLE: List the contents of the savename VOL003 for a volume save.

```
COMMAND (?): LI
*** WAIT ... REWINDING TAPE ***
ENTER SAVENAME (DEFAULT IS LIST ALL): VOL003
TAPE-ID: TAPE01
TAPE DESCRIPTION:
This tape contains ...
*** WAIT ... LIST IN PROGRESS ***
SAVENAME: VOL003      (1)
SAVE TYPE: SV
DATE: 10/12/84      TIME  4:22
VOLUME              SIZE
EDX003              20000
NUMBER OF DATA SETS SAVED FROM EDX003      5
DISPLAY THE CONTENTS? (Y/N): Y
DATA SET(S)          SIZE          TYPE
TEST1                100          DATA
TEST2                500          DATA
TEST3                200          PGM
ASMOBJ               400          DATA
ASMWORK             600          DATA
DO YOU WISH TO CONTINUE? (Y/N): N
LIST COMPLETE ***
COMMAND (?): EN
```


EXAMPLE: List the contents of the savename SAVEDS for a data set save.

```
COMMAND (?): LI
*** WAIT ... REWINDING TAPE ***
ENTER SAVE NAME (DEFAULT IS LIST ALL): SAVEDS
TAPE-ID: TAPE01
TAPE DESCRIPTION:
This tape contains ...
*** WAIT ... LIST IN PROGRESS ***
SAVENAME: SAVEDS          (1)
SAVE TYPE: SM
DATE: 10/12/84          TIME 4:22
VOLUME          SIZE
EDX003          3800
NUMBER OF DATA SETS SAVED ON EDX003    7
DISPLAY THE CONTENTS? (Y/N): Y
DATA SET(S)      SIZE      TYPE
BKPTTEST         100      DATA
$DISKUT1         200      PGM
$COPY            200      PGM
TEST             1000     DATA
TEST3            1000     DATA
DEST3            500      DATA
MY1SORTP         800      DATA
DO YOU WISH TO CONTINUE? (Y/N): N
LIST COMPLETE ***
COMMAND (?): EN
```

LH - LIST TAPE HEADER

The LH command will display the tape-id and tape description that is written on the first block of the tape(s) during the Initialization (I) or Clear (CL) operations.

The LH command should be run after all Saves are done on a tape to provide an additional check on the overall operation of the tape.

EXAMPLE: List the tape header

```
COMMAND (?): LH
TAPE-ID: TAPE01
TAPE DESCRIPTION:
This tape contains ...
COMMAND (?): EN
```

If the tape unit is being used as a dual drive (80820-10 models only), the tape header for the cartridge in drive 2 will also be displayed.

If the tape header cannot be read the following message will be displayed:

TAPE HAS NOT BEEN INITIALIZED

I - INITIALIZE THE TAPE

Use the I option to completely erase the tape(s) and then label the tape(s) with a tape identification header record consisting of a TAPE-ID and TAPE DESCRIPTION, followed by an end-of-file record. This option will destroy all data on the tape(s).

EXAMPLE: Initialize the tape.

```
COMMAND (?): I
*** WARNING !!! INITIALIZE WILL DESTROY ALL DATA ON THE TAPE ***
DO YOU WISH TO CONTINUE? (Y/N): Y
ENTER TAPE-ID: TAPE01
ENTER TAPE DESCRIPTION:
This tape contains ...
*** WAIT ... ERASE IN PROGRESS ***
*** WAIT ... REWINDING TAPE ***
*** WAIT ... INITIALIZE IN PROGRESS
*** END-OF-FILE-RECORD WRITTEN
*** INITIALIZE COMPLETE ***
COMMAND (?):EN
```

** Note: If the tape unit is being used as a dual drive (80820-10 models only), the cartridges in both drives will be initialized. The data on BOTH cartridges will be destroyed.

CL - CLEAR THE TAPE

Use the CL option to erase the tape(s) and write an end-of-file record immediately following the existing tape identification header record. This option will destroy all data following the tape identification header record.

EXAMPLE: Clear the tape.

```
COMMAND (?): CL
*** WARNING !!! CLEAR WILL DESTROY ALL DATA ON THE TAPE ***
DO YOU WISH TO CONTINUE? (Y/N): Y
*** WAIT ... REWINDING TAPE ***
*** WAIT ... CLEAR IN PROGRESS
*** WAIT ... ERASE IN PROGRESS
*** WAIT ... REWINDING TAPE ***
*** END-OF-FILE-RECORD WRITTEN
*** CLEAR COMPLETE ***
COMMAND (?): EN
```

** Note: If the tape unit is being used as a dual drive (80820-10 models only), the tape cartridge in both of the drives will be cleared. This option will destroy all data on BOTH tapes.

ER - ERASE THE CONTENTS OF THE TAPE

Use the ER option for security purposes to completely erase the tape(s). This option will completely destroy all data on the tape(s).

EXAMPLE: Erase the tape.

```
COMMAND (?): ER
*** WARNING !!! ERASE WILL DESTROY ALL DATA ON THE TAPE ***
DO YOU WISH TO CONTINUE? (Y/N): Y
*** WAIT *** ERASE IN PROGRESS ***
*** ERASE COMPLETE ***
COMMAND (?): EN
```

** Note: If this tape unit is being used as a dual drive (80820-10 models only), BOTH tape cartridges will be completely erased.

TN - RETENSION THE TAPE

Use the TN option to retension the tape(s) so it is consistently tensioned. It should be used on a new tape or a tape that has been in storage for a long time.

EXAMPLE: Retension the tape cartridge.

```
COMMAND (?): TN
**** WAIT *** RETENSION IN PROGRESS ****
*** RETENSION COMPLETE ***
COMMAND (?):
```

Note: If the tape unit is being used as a dual drive (80820-10 models only), the cartridges in both drives will be retensioned.

VF - READ VERIFY THE TAPE

Use the VF command to verify the readability of the tape cartridge(s). The command should be executed on a used tape cartridge. Because the command does not destroy data, there is no need to backup the data before verifying the tape. Use attn/CA to abort the verify function.

EXAMPLE: Verify the tape cartridge.

```
COMMAND (?): VF
**** WAIT **** VERIFY IN PROGRESS ****
*** VERIFY COMPLETE ***
nnnnnn BLOCKS VERIFIED nnnnn MARGINAL BLOCKS
COMMAND (?): EN
```

Marginal blocks are tape data blocks that the utility failed to read properly at least once, but did read correctly within sixteen retries.

Note: If the tape unit is being used as a dual drive (80820-10 models only), the cartridge in both of the drives will be verified.

CF - WRITE CERTIFY THE TAPE

Use the CF option to check the ability to write and read data on the tape(s). It should only be used on a tape that is having problems or a new tape. If CERTIFY is used, the user should copy everything from the tape(s) to disk. The utility certifies the tape(s) by writing a worst case data pattern on tape and then reading the written data. The tape(s) are initialized after certifying it. Use attn/CA to halt the command execution at any time during execution of the certify and verify functions.

EXAMPLE: Certify the cartridge tape.

```

:-----:
: COMMAND (?): CF
:
: *** WARNING !!! TAPE CERTIFY WILL DESTROY ALL DATA ON THE TAPE ***
: DO YOU WISH TO CONTINUE? (Y/N): Y
:
: READ VERIFY AFTER CERTIFY? (Y/N): Y
:
: *** ... CERTIFY IN PROGRESS ***
:
: ***CERTIFY COMPLETE***
: nnnnn BLOCKS CERTIFIED      nnnnn MARGINAL BLOCKS
: REWINDING TAPE....
: ***WAIT ...VERIFY IN PROGRESS ***
: nnnnn BLOCKS VERIFIED nnnnn MARGINAL BLOCK(S)
:
: ENTER TAPE-ID: TAPE01
: ENTER TAPE DESCRIPTION:
: This tape contains ...
:
: *** WAIT ... REWINDING TAPE ***
: *** WAIT ... ERASE IN PROGRESS ***
: *** WAIT ... INITIALIZE IN PROGRESS ***
: *** END-OF-FILE-RECORD WRITTEN
: *** INITIALIZE COMPLETE ***
:
: COMMAND (?) EN
:-----:

```

Marginal blocks are tape data blocks that the utility failed to write/read properly at least once, but did write/read correctly within sixteen retries.

** Note: If the tape unit is being used as a dual drive (80820-10 models only), both tape cartridges will be certified. The data on BOTH tape cartridges will be DESTROYED.

DA - CHANGE TAPE DEVICE ADDRESS

Use the DA command to change the present tape device address of hexadecimal 4C to a different tape device address.

EXAMPLE: Change tape device address to 06.

```
COMMAND (?): DA
CURRENT TAPE DEVICE ADDRESS IS 4C
ENTER DEVICE ADDRESS IN HEX: 06
COMMAND (?):
```

To keep the current tape device address, the user presses the ENTER key. The current tape device address will not change.

NOTE: To eliminate the need to enter this command every time TPCOPY23 is loaded, a patch can be made near the beginning of the tapecopy programs using program \$DISKUT2. Each program (TPCOPY23, TPSAVE23, and TPREST23) requires a one word patch to change the default device address. Following is a list of the addresses to patch in each of the three programs.

	Program patch location	Default device address
TPCOPY23	00FE	F4C3
TPSAVE23	0136	004C
TPREST23	0178	004C

DO - DIRECT OUTPUT TO ANY OTHER TERMINAL

The DO command enables the user to direct listings to any terminal specified by the user.

The program prompts:

COMMAND (?):

The user enters DO. The name of the terminal can also be entered after the command with a space in between. If the name of the terminal is not entered, the program prompts:

ENTER THE NAME OF THE TERMINAL:

The user will enter the name of the terminal where the output from the program is to be directed.

When using the DO command while in direct mode (ie. non ex-mode) the following listings will be sent to the terminal specified by the user:

- all listings using the LI or LH commands,
- the names of all the data sets saved using the SM or SA commands,
- the names of all the data sets restored using the RM or RA commands.

While in ex-mode (EX) all output messages, following the DO command, will be directed to the terminal specified by the user. The only exception is if multiple cartridges are needed during a save or restore operation a message indicating necessary user action will be displayed on the terminal TPCOPY23 was loaded from.

DD - SELECT DUAL DRIVE (80820-10 models only)

The DD command enables the user to select to use the 80820-10 as a dual drive. All commands will then be performed on both drives.

```
COMMAND (?): DD
DUAL DRIVE SELECTED
```

D1 - SELECT DRIVE 1 ONLY (80820-10 models only)

The D1 command enables the user to select to use drive 1 only.

```
COMMAND (?): D1
DRIVE 1 SELECTED
```

D2 - SELECT DRIVE 2 ONLY (80820-10 models only)

The D2 command enables the user to select to use drive 2 only.

```
COMMAND (?): D2
DRIVE 2 SELECTED
```

EX - EXECUTE COMMANDS FROM A DATA SET

Use the EX command to perform the EDX utility commands with a minimum of operator intervention. A data set, created with \$FSEDIT, contains the utility commands. This data set can be invoked using the EX command, either directly, or indirectly through the EDX job utility \$JOBUTIL. The EX command reads each line of the data set file, displays each line on the terminal and executes each line as an utility command.

The following syntax rules must be considered when creating the execute command data set with \$FSEDIT.

- Begin each TPCOPY23 command in position 1.
- Begin the savename in column 4 or any column after column 4.
- Separate the savename(s) and/or volumes with either space(s) (any number) or commas.
- Use the EN command to identify the end of the data set to be executed with the EX command.
- In EX mode all saves will be appended to the existing data on tape.
- If the Initialization (I) command or the Certify (CF) command is used while in EX-mode, the tape-id(s) must be on the same line as the "I"/"CF" command. If a dual drive is being used, the tape-id for drive 1 must be separated from the tape-id for drive 2 by a "/" (i.e. TAPE01/TAPE02). If a tape description is to be entered, an "*" must be entered in column 72 of the command line and the description will be on the next line starting in any column after column 3. If a tape description is to be entered for the tape in drive 2, an "*" must be entered in column 72 of the line of the tape description for the tape in drive 1, then the tape description for drive 2 will be entered on the next line.
- Following is a list of the SYNTAX rules for each of the EX TPCOPY23 commands. See COMMAND PARAMETER DEFINITIONS on page 5-1 for a description of the following parameters.

NOTE: Any of the following parameters enclosed in / / are optional.

SD	savename	device-address		
SV	savename	disk-volume		
SM	savename	disk-volume	dataset1	/dataset2/ /dataset3/ /dataset4/ ...
SA	savename	disk-volume		
RD	savename	device-address		
RV	savename	disk-volume		
**	To restore data set member(s) from a tape file that was created using the SV, SM or SA commands:			
RM	savename	disk-volume	dataseta	/datasetb/ /datasetc/ /datasetd/ /datasete/ ...
RA	savename	disk-volume		

```

**      To restore data set member(s) from a tape file that was
        created using the SD command:
RM      savename  tape-volume  disk-volume  dataseta  /datasetb/
        /datasetc/ ...
RA      savename  tape-volume  disk-volume
LI      /savename/                                * default is to list entire tape
LH
I        tape-id1/tape-id2                        *
        tape description 1                        *
        tape description 2
CL
ER
TN
VF                                * read verify
CF      tape-id1/tape-id2                        * read verify and write certify *
        tape description 1
        tape description 2
DA      tape address
DD      /terminal/                                * default is the terminal
                                                TPCOPY23 was loaded from

```

Following are a few examples of EX files.

This first example changes the tape address to 06, directs the output to \$SYSPRTR, clears the tape, saves the device at address 03 using savename SAVEDEV, lists the contents of the tape, restores the saved device to the device at address 48, restores some members from tape volume EDX002 to disk volume SMD002, restores all members from tape volume ASMLIB to disk volume SMDLIB.

```

DA      06
DD      $SYSPRTR
CL
SD      SAVEDEV 03
LI
RD      SAVEDEV 48
RM      SAVEDEV  EDX002  SMD002  $DISKUT? WORK1 WORK2  $EDXASM
        $EDXLINK
RA      SAVEDEV  ASMLIB  SMDLIB
EN

```


This second example initializes the tape(s) with the tape-id(s) TAPE01 and TAPE02, saves the entire disk volume EDX002 using save name SAVEVOL, saves all the datasets from disk volume ASMLIB using savename SAVEALL, saves some specific datasets from disk volume EDX003 using savename SAVEMEM, lists the contents of savename SAVEALL, restores the tape volume EDX002 to disk volume SMD002, restores some selected datasets from the tape volume EDX002 to disk volume EMD002, restores all the datasets from tape volume ASMLIB to disk volume SMDLIB, restores some selected datasets from tape volume EDX003 to disk volume SMD003.

```
I    TAPE01/TAPE02
      This is tape 1
      This is tape 2
SV   SAVEVOL    EDX002
SA   SAVEALL    ASMLIB
SM   SAVEMEM    EDX003   WORK?? TEMP?
LI   SAVEALL
RV   SAVEVOL    SMD002
RM   SAVEVOL    EMD002   $DISKUT? WORK?
RA   SAVEALL    SMDLIB
RM   SAVEMEM    SMD003   WORK1  TEMP1
EN
```

*
*

This final example certifies both tapes followed by an Initialize using tape-id(s) TAPE01 and TAPE02, then saves the device at address 03 using savename SAVEDEV then lists the tape header to ensure the overall operation of the tape.

```
CF   TAPE01/TAPE02
      This is tape 1
      This is tape 2
SD   SAVEDEV    03
LH
EN
```

*
*

EXECUTE EX COMMAND DIRECTLY

Create a data set of TPCOPY23 utility commands with \$FSEEDIT.
See the section EX-EXECUTE COMMANDS FROM A DATA SET on page 6-1 for
a list of syntax rules to create the data set. Store the data set
on EXFILE,EDX002.

Following is an example of how to invoke TPCOPY23 commands directly
using the Execute commands (EX).

```
COMMAND (?): EX
ENTER DATA SET (NAME,VOLUME): EXFILE,EDX002
EXECUTE FROM DATA SET EXFILE ON VOLUME EDX002? (Y/N): Y
```

EXECUTE EX COMMAND THROUGH EDX JOB UTILITY

You can invoke the EX command indirectly through the EDX job utility \$JOBUTIL. To use this method, use \$FSEDIT to create two data sets. The first data set contains the TPCOPY23 utility commands. The second data set contains the \$JOBUTIL instructions, which will open and execute the first data set.

For example, data set EXFILE, created with \$FSEDIT contains TPCOPY23 utility commands. The data set resides on volume EDX002. Use \$FSEDIT to create a data set of job utility instructions as follows:

```
PROGRAM    TPCOPY23,EDX002
PARM       EXFILE,EDX002      (Dataset name and volume of file containing
                               Tapecopy utility commands.)
EXEC
EOJ                               (End of job)
```

Save the job utility data set under any name on any volume, e.g.
Data set name of job utility instructions TAPEJOB
Volume on which data set resides BACK04

Execute the job utility using the EDX utility \$JOBUTIL.

```
$L $JOBUTIL TAPEJOB,BACK04
```

TPCOPY23 loads automatically. Data set EXFILE on EDX002 automatically opens and the TPCOPY23 utility commands execute. After EXFILE completes execution, control passes back to the job utility file. The job ends as the job stream contains no other jobs. A list of the possible condition codes issued by TPCOPY23 after execution are listed in the section ERROR MESSAGES on page 9-1. Use these condition codes to JUMP to label on condition to bypass selected programs in the job stream or to conditionally abort job utility execution. A condition code of -1 means TPCOPY23 commands executed successfully. A condition code of -2 means TPCOPY23 commands executed successfully, but during a Save or Restore operation the recommended number of retries was exceeded. (See SOFTWARE RECOMMENDATIONS on pg 3-1 for a further explanation of the recommended number of retries. See the flowchart on pg 8-2 to determine the correct action to take.)

EXECUTE TPSAVE23 AND TPREST23 DIRECTLY

The recommended procedure is to load the entire TPCOPY23 utility from the IPL volume to the system. Loading the entire TPCOPY23 utility onto the system allows the user to execute both save and restore functions as well as any control functions that might be needed.

For systems that do not have enough memory, the save (TPSAVE23) and restore (TPREST23) programs can be loaded directly from the IPL volume.

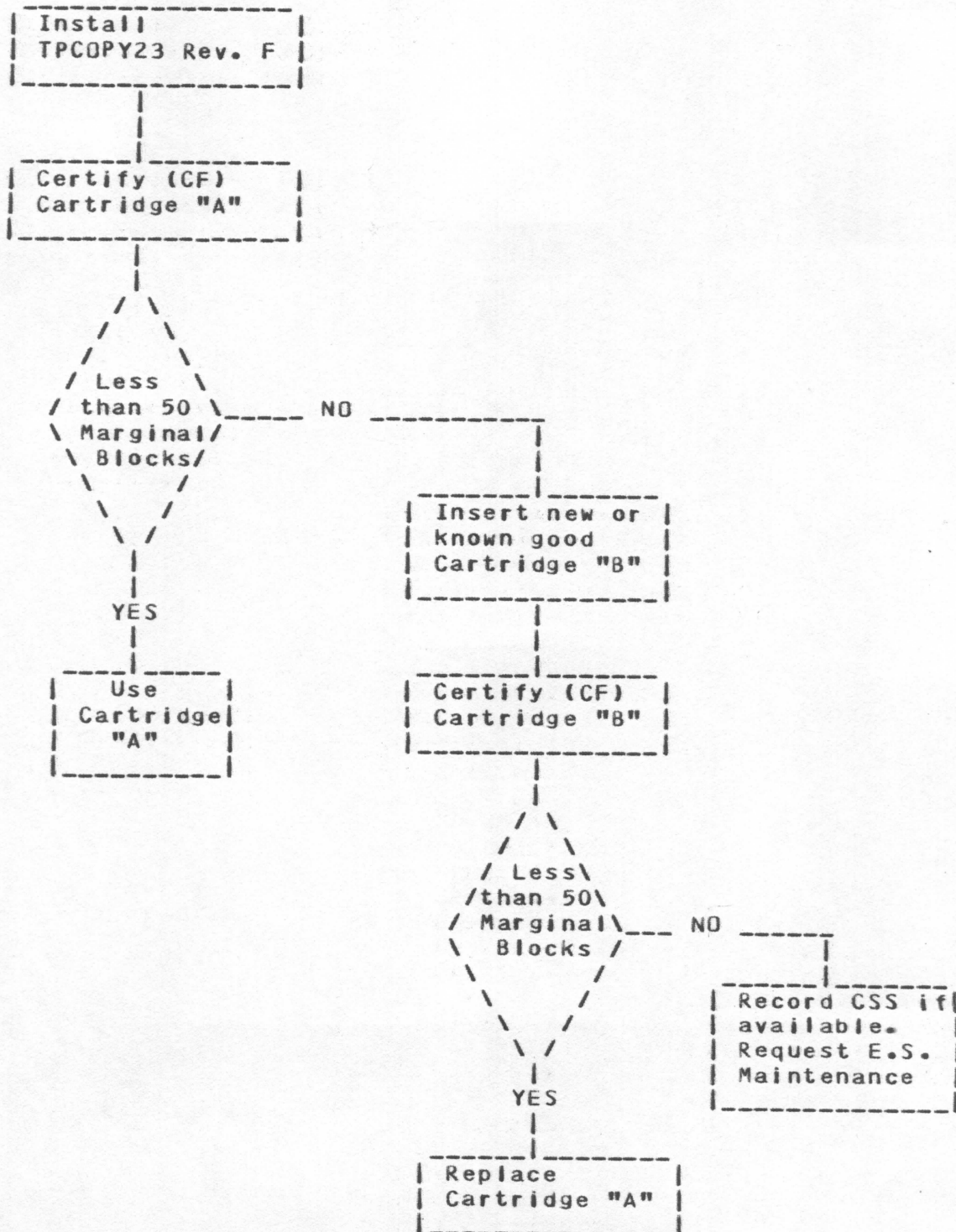
Load the Cambex program from the IPL volume as follows:

- > \$L TPSAVE23 (Loads only the program that executes the save functions of the utility.)
- > \$L TPREST23 (Loads only the program that executes the restore functions of the utility.)

If the save program (TPSAVE23) is loaded separately then only the save options are displayed to the command prompt (?). Similarly if the restore (TPREST23) program is loaded separately then only the restore options are displayed to the command prompt (?).

If using the 80820-10 streamer tape, the software will prompt you whether you want to use the unit as a dual drive, drive 1 only or drive 2 only.

NEW SYSTEM SETUP

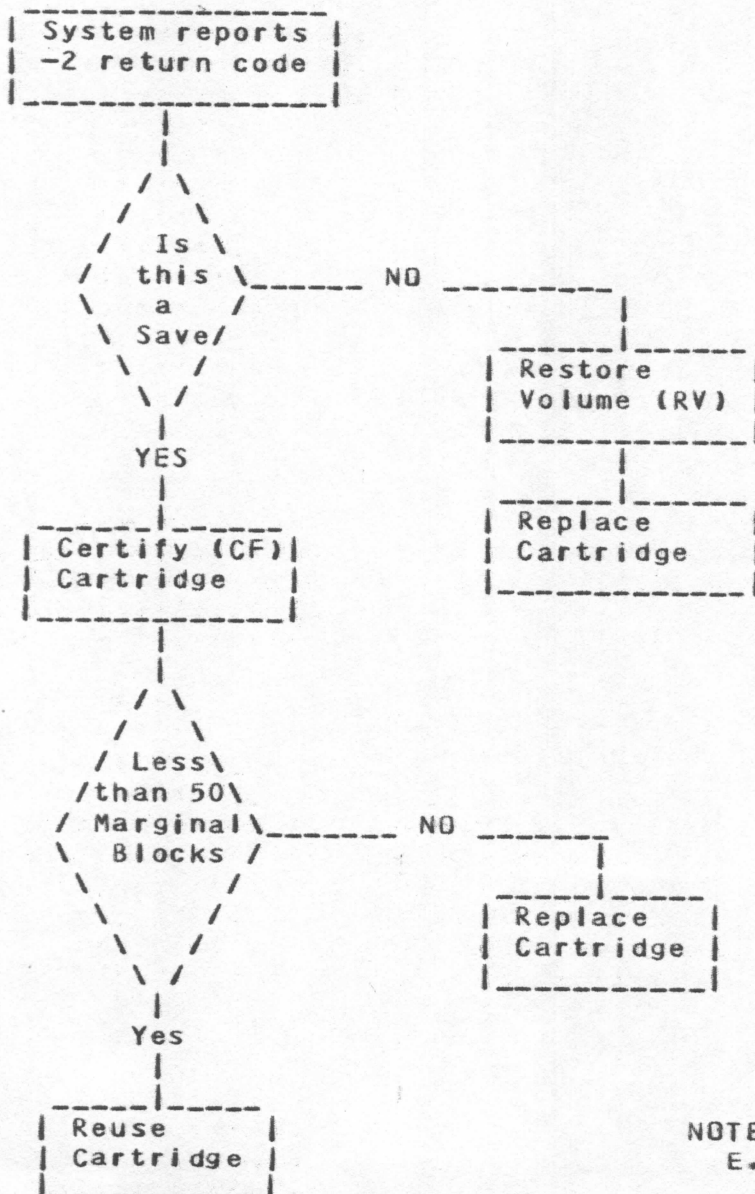


Note:

E.S. = Engineering Services

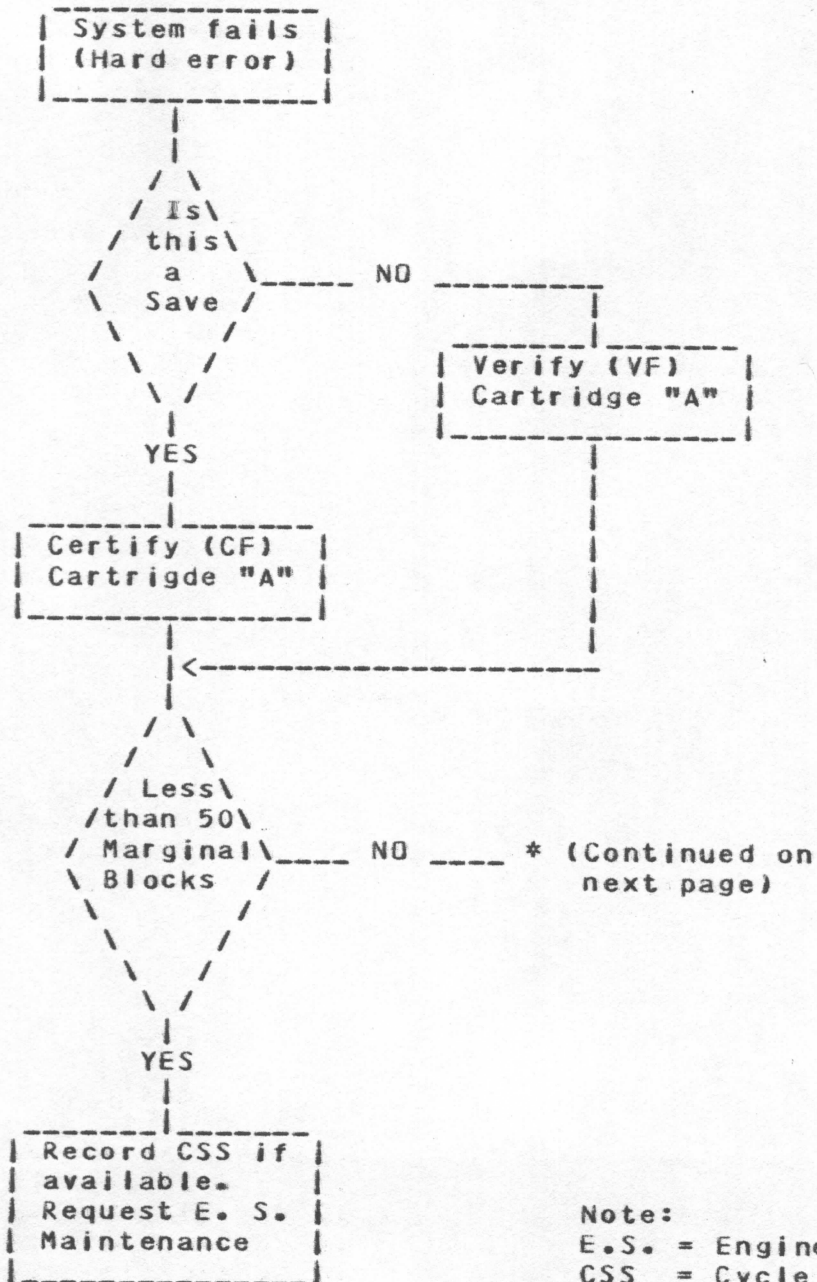
CSS = Cycle Steal Status

System Has Been Operational
(-2 code occurs)



NOTE:
E.S. = Engineering Services

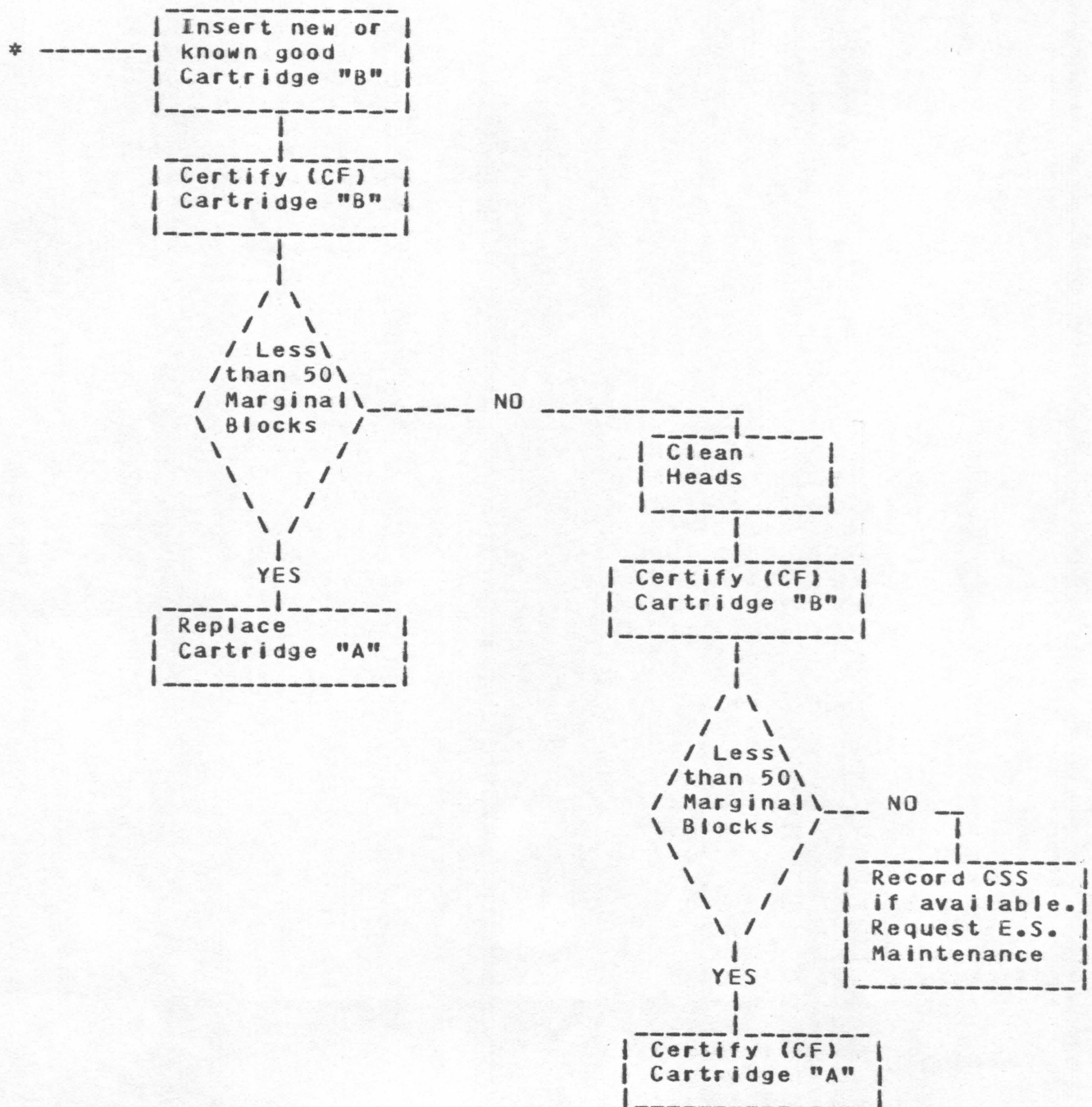
System Has Been Operational
(Hard Error Occurs)



Note:

E.S. = Engineering Services

CSS = Cycle Steal Status words



ERROR MESSAGES

DISK ERRORS

Control file
return codes

- 100 ERROR OPENING CONTROL FILE
 Unable to open the control file.
- 101 ERROR READING CONTROL FILE
 A data set read error occurred while reading the control file.
- 102 ERROR ALLOCATING WORK DATA SET
 Unable to allocate a work data set needed to store the directory
 during a SM, SA, RM or RA.
- 103 UNABLE TO DELETE WORK DATA SET
 Unable to delete the work data set.
- 104 ERROR WHILE READING WORK DATA SET
 A data set read error occurred while reading a work data set.
- 105 ERROR WHILE WRITING TO WORK DATA SET
 A data set write error occurred while writing to a work
 data set.
- 106 NO SPACE IN WORK DATA SET
 Work data set is full.
- 107 ERROR OPENING VOLUME
 Unable to open the disk volume.
- 108 DISK DIRECTORY READ ERROR
 An error was detected while reading the disk directory. The
 save was not performed.
- 109 DISK NOT INITIALIZED
 The SD option cannot be used on a disk device which has not
 been initialized with the IBM utility \$INITDSK.
- 110 DISK ADDRESS NOT FOUND ON SYSTEM
 There is no disk at the device address specified.
- 111 VOLUME TOO SMALL FOR RESTORE
 While restoring a volume from tape, the utility found the space
 on the target volume on disk was not large enough. The utility
 displays the sizes of the source and target volumes thus:
 TAPE RECORD COUNT = XXXX
 DISK RECORD COUNT = XXXX

- 112 INVALID DEVICE ADDRESS
The device address specified is not correct. It must be in the range of 00-FF.
- 113 ERROR ALLOCATING DATA SET
Unable to allocate a data set on the specified volume.
- N/A DISK READ ERROR
An error was detected in reading the data from disk. The user has the option to continue the save command by filling in the record in error with x'FF'. If a DISK READ ERROR occurs while running in ex-mode the save will automatically continue.
- N/A DISK WRITE ERROR
Tape cartridge was unable to write data to the disk. The user has the option to continue the restore command by skipping over the record in error. If a DISK WRITE ERROR occurs while running in ex-mode the restore will automatically continue.
- N/A INSUFFICIENT CONTIGUOUS SPACE IN VOLUME
The utility could not find enough contiguous space on disk while executing the RM or RA command.
- N/A INSUFFICIENT DIRECTORY SPACE
The utility detected a full disk directory while executing the RM or RA command.
- N/A INSUFFICIENT SPACE IN VOLUME
While restoring data to the disk using the RM or RA option, the utility ran out of space on the volume to which the data was being restored.
- N/A TYPE MISMATCH OF DATA SETS
The data sets specified for the RA or RM option did not match in type (program versus data) the data sets on the disk. Delete or rename the data sets on disk.
- N/A UNKNOWN DS OPEN ERROR
Unable to open data set.
- N/A VOLUME EMPTY
The volume specified for the SM, SA or SV options contained no data sets.
- N/A VOLUME NOT FOUND
The volume specified for the save or restore option does not exist.
- N/A VOLUME NOT INITIALIZED. CANNOT SAVE
The utility saves only volumes initialized by the IBM utility \$INITDSK.

TAPE ERRORS (HARD)

The Cycle Steal Status words will be displayed after any hard tape error. If the error is correctable without the assistance of Engineering Services disregard the Cycle Steal Status words. If the assistance of Engineering Services is needed record the Cycle Steal Status words and give to the Customer Engineer.

Control file
return codes

- 2 *** WARNING ***
 THIS TAPE HAS EXCEEDED THE RECOMMENDED NUMBER OF RETRIES
 See SOFTWARE RECOMMENDATIONS on page 3-1 for an explanation
 of the recommended number of retries. Refer to the flowchart
 on page 8-2 for the correct procedure to be followed.
- 120 UNRECOVERABLE TAPE READ ERROR
 The cartridge tape drive cannot read the data on tape.
 Refer to the flowchart on page 8-3 for the correct procedure
 to be followed.
- 121 UNRECOVERABLE TAPE WRITE ERROR
 The cartridge tape drive cannot write the data to the tape.
 Refer to the flowchart on page 8-3 for the correct procedure
 to follow.
- 122 UNKNOWN TAPE ERROR
 An unknown tape error occurred. Retry the operation, if
 an UNKNOWN TAPE ERROR still occurs, refer to the flowchart
 on page 8-3 for the correct procedure to follow.
- 123 WRITE ERROR WHILE ATTEMPTING TO WRITE END-OF-FILE MARKER
 Unable to write the end-of-file marker.
- 124 DEVICE AT ADDRESS IS NOT A TAPE
 The tape address specified is incorrect.
- 125 TAPE CARTRIDGE IS WRITE PROTECTED
 The write protect switch is set on the cartridge tape. No
 data can be written to the tape.
- 126 CARTRIDGE NOT INSERTED
 No tape cartridge inserted in tape unit.
- 127 TAPE UNIT NOT OPERATIONAL
 FATAL ERROR. Record the cycle steal status words and contact
 Engineering Services.
- 128 CRC ERROR
 The data read from tape is invalid, retry the operation.

N/A

TAPE READ ERROR

An error was detected trying to read from the tape.
The user has the option of continuing the restore by filling
in the record in error with x'FF'.
If the tape read error occurred while in ex-mode (EX) the
restore will automatically continue.

N/A

TAPE DATA SETS NOT ALLOWED

The utility tried to save or restore data sets residing
on the IBM tape unit.

EXIO ERRORS

Control file
return codes

- 140 ERROR OPENING TAPE UNIT
 Unable to open the streaming tape unit.
- 141 TAPE DRIVE IN USE BY ANOTHER PROGRAM
 The cartridge tape is currently being used by another program.
 EDX may be accessing the tape drive from another partition.
- 142 TAPE UNIT ADDRESS INCORRECT
 The device address for the tape drive is invalid.
- 143 EXIO ERROR
 An error was detected while trying to perform an EXIO
 operation on tape.

CONTROL FILE ERRORS

Control file
return codes

- 160 INVALID COMMAND
 An invalid operation was read from the control file.
- 161 TAPE DEVICE ADDRESS MISSING FROM DA COMMAND
 A device address must be included when using the DA command
 within a control file.
- 162 SAVENAME INVALID OR MISSING
 Savename is missing or invalid from the control file.
- 163 VOLUME NAME INVALID OR MISSING
 Volume name is missing or invalid from the control file.
- 164 DATA SET NAME INVALID OR MISSING
 Data set name is missing or invalid from the control file.

MISC. ERRORS

Control file
return codes

- 180 TAPE HAS NOT BEEN INITIALIZED
The tape cannot be used for any of the save, restore or list options until it has been initialized using the I command.
- 181 DEVICE DIRECTORY NOT FOUND
The device directory on tape cannot be found for RM or RA options.
- 182 VOLUME NOT FOUND IN DIRECTORY
Volume not found in the device directory on tape.
- 183 DATA SET DIRECTORY NOT FOUND FOR VOLUME
The data set directory for the specified volume not found on tape for the RM, RA or LI options.
- 185 SAVENAME NOT FOUND
The savename specified for a restore operation does not exist on this tape.
- 186 SAVENAME ALREADY EXISTS ON TAPE
A cartridge tape cannot have duplicate savenames.
- 187 SAVENAME IS NOT A VOLUME SAVE
The RV command was used to restore data that had not been saved using the SV command.
- 188 SAVENAME IS NOT A DEVICE SAVE
The RD command was used to restore data, from tape, that had not been saved using the SD command.
- 189 SAVE PROGRAM LOAD FAILURE
Unable to load TPSAVE21.
- 190 RESTORE PROGRAM LOAD FAILURE
Unable to load TPREST21.
- 191 SAVE WAS NOT DONE ON V2M1
Cannot restore data using V2M1 tapecopy programs that was saved using V2M0 or earlier tapecopy programs.
- 192 DATA SET NAMES MUST NOT EXCEED 958
958 is the maximum data set names that can be entered during a SM or RM.
- 193 TAPE DATA SET DIRECTORY ERROR
Have read past data set on tape. Retry the restore command.

- 194 END OF RECORDED DATA. RESTORE INCOMPLETE
The utility encountered end of saved data on tape while restoring data to the disk. This occurs when a save operation was aborted by the operator.
- 195 BLANK TAPE
Trying perform one of the restore operations from a blank tape.
- 196 THIS TAPE CONTAINS A CONTINUATION OF SAVENAME
Found the savename to be used for the restore, but it is a continuation tape. Must insert the first tape of the specified savename.
- 197 NO AVAILABLE SPACE ON TAPE
No data can be saved on the tape cartridge as it is full. Insert another blank tape or erase the currently mounted cartridge tape. If trying to perform the save from a control file the operation is aborted.
- 198 HEADER DATA EXPECTED AND NOT FOUND
The tape cartridge was unable to find a header.
- 199 INVALID TAPE UNIT ADDRESS
The tape unit device address specified with the DA command is invalid.
- 200 OPERATOR ABORT
The operation was aborted by the operator.
- N/A DATA SET NOT FOUND OR DUPLICATE DATA SET NAME
The specified data set does not exist on disk for the SM option or the data set does not exist on tape for the RM option or the data set name was entered more than once.
- N/A VOLUME NOT FOUND ON SAVED DEVICE
The specified volume was not found in the device directory on tape for the RM, RA or LI options.
- N/A INPUT ERROR. TOO MANY CHARACTERS
Invalid data entered by the user. Check user's guide for correct syntax.
- N/A INVALID COMMAND
An invalid command was entered. Enter "?" after the command prompt for a list of the valid commands.
- N/A INVALID DATE
The date was not entered correctly.
- N/A INVALID TIME
The time was not entered correctly.

N/A NO DATA SETS FOUND
None of the data sets entered by the user for saving were found in the disk directory or for restoring were found in the tape directory.

N/A RESTORE ABORTED BY OPERATOR. RESTORE INCOMPLETE
The operator aborted a restore operation by entering attn/ABORT.

N/A NOT A CONTINUATION TAPE
This tape is not a continuation of the file being restored.

N/A NOT TAPE. USE DA COMMAND TO SET DEVICE ADDRESS
The tape device address is not the default device address. Must use the DA command to set device address.

N/A SAVENAME DOES NOT MATCH THIS TAPE
The cartridge tape used to continue a restore operation has a different savename than the one on the previous cartridge. On a multi-tape restore all the cartridge tapes of the series must have the same savename.

N/A WRONG TAPE SEQUENCE
While performing a restore operation of a multi-tape volume the tape inserted to continue the restore is not the next tape in sequence.